

Comment on essd-2021-55

Anonymous Referee #1

Referee comment on "UV-Indien network: ground-based measurements dedicated to the monitoring of UV radiation over the western Indian Ocean" by Kevin Lamy et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-55-RC1>, 2021

General Comments:

This article presents a new data set of UV index observations for an area of the world that generally lacks observations. A comparison is presented with UV indices derived from various satellite products. On the whole, these items are worthy of publication in some venue. However, based on the provided review guidelines as I understood them, I could not confirm that the submission meets the objectives of a data description article for the Earth System Science Data journal. Quoting from the aims and scopes of the ESSD (https://www.earth-system-science-data.net/about/aims_and_scope.html),

"Articles in the data section may pertain to the planning, instrumentation, and execution of experiments or collection of data. Any interpretation of data is outside the scope of regular articles. Articles on methods describe nontrivial statistical and other methods employed (e.g. to filter, normalize, or convert raw data to primary published data) as well as nontrivial instrumentation or operational methods. Any comparison to other methods is beyond the scope of regular articles."

This article does describe how the data was gathered and processed, including calibration information, but this is actually a minor portion of the text and mostly references other sources. The bulk of article describes interpretation of the data, for example the presence of cloud enhancement, and comparisons of radiometer data with results determined by other methods (satellite and model-based products). The short summary states that the article concerns the validation of a new dataset from the measurement of ultraviolet radiation, but the validation described in the lines 110-115 is actually of the satellite and model based numerical products given the ground-based radiometric measurements.

Moreover, a stated criterium of a ESSD contribution is that it should be easy for any interested person to use the associated archived data, but the data available at

<https://zenodo.org/record/4572026#.YH8SL2gpC9Y> doesn't quite meet that standard. The meta data should provide more information, including what zone is used for time (UTC? LT?), what is a UV index, and what is meant by an "Instant Reading". In one of the data sets, AnseQuitor, the same observation occurs in triplicate at each time point which appears to be an error. The files include data at "night" (SZA >90 but not reported) which are all zero and makes the files unnecessarily long (zero data is omitted for the St-Denis data). The cloud fraction data includes the red-blue ratio the derivation of which is not described in the article. Finally, the data doi only includes the radiometer (Kipp Zonen erythema) data and not the other data referenced in the paper, including the Bentham spectroradiometer data, TOC and UVI derived from the satellite and model products.

Calibration procedures are mentioned in the article but details are omitted, in particular when calibrations were performed for the data presented. The article does mention plans for future operation and procedures for future calibrations. This information will be of interest to the reader but is not directly relevant to the archived data. The organization would be improved by segregating such information in a separate section on titled something like "future operations".

This is the first paper I have reviewed for ESSD and perhaps I have applied the criteria for publication too narrowly. For this reason, I have not recommended outright rejection and leave it to the editor to make the final judgement. Whatever course is taken, the mss and data sets with revisions should be appropriate for publication in this or some other venue for reporting geophysical results. In the revision, I recommend attending to the points made above and a number of specific issues as follows:

3.1 Calibration – This section refers to results on Radiometer ADs and RDs relative to the Bentham spectroradiometer but only qualitative description is given. Comparing this section and the data section lines 95-109, I am confused about what calibrations were used and how they were done. Line 97 says that the radiometers will be calibrated every two years. How about the calibrations for the presented data? In section 3.1, differences are described between radiometer based and spectroradiometer based UVI for the "recent recalibration". What was the calibration of the radiometers for this comparison? Later in the paragraph, it is stated that "differences were used to recalibrate the radiometer". But isn't that what is usually done in a calibration against a reference instrument?

What are the criteria for determining which measurement are "clear-sky" and what is meant by a "clear sky day"? Please specify. The text says, e.g., that there are 16% "clear sky days" at Antananarivo, but the data set AntananarivoSKYCAMVISION has < 1% of 30s resolution data with CF=0.

Line 93 "on station Juan de Nova"

Should read "one station at Juan de Nova"?

Line 95 "All stations are now equipped with a Kipp & Zonen UVS-E-T broadband radiometer."

Table 3 and later text states that some of the radiometers are the SUV-E model

Line 96 "The raw UV measurements obtained by the radiometers are reprocessed considering the calibrations and TOC measured simultaneously."

Please describe and/or give reference for the reprocessing procedure. The reference given in Table 2 describes how the KZ radiometer was calibrated in Davos, but what is the current procedure?

Line 101 "on a smaller mesh size"

Not clear what this means

Line 212 "Table 4 presents the different radiometers and their current locations, along with the date of the next calibration"

This information is in Table 3

Line 225 Figure 2 shows the period covered by each data set at these four stations.

The figure only has one line covering data for the broad-band radiometers, does not show each station separately

Line 315 – UV enhancement by cloud scattering is a well known and widely occurring phenomenon, would be appropriate to cite the Sabburg and Wong (2000) paper here, also see Badosa et al. (2014)

Line 347 "The density of the corresponding data set for each month of the year is represented in Figure 7b"

Please define what is density in this context, proportion of what?

Line 394 - The correlation coefficient between the satellite or model estimates and the ground-based measurements was greater than 0.9 at all stations except Mahe and for all datasets except OMUVBG.

Revise to state that correlation applies only for clear sky conditions

6-Conclusions

Perhaps the authors can comment on why of the three stations at similar south latitude, Antananarivo, Anse Quito, and St-Denis, the UV-index, even for clear sky, seems to be systematically lower at St-Denis. For example, the noon mean CS UVI is ~10 at St.-Denis but ~12 at Anse Quito. The maximum CS UVI is ~18 at Anse Quito and ~17 at Antananarivo, but <15 at St-Denis.

Figure 1, Map – add Latitude and Longitude

Figure 3 caption– What do the gray bars represent in the histogram sub figures? This also applies to the Appendix figures

Figure 5. The caption reads “Diurnal Cycle of UVI at ST-DENIS.”

The figure actually has all stations, not just ST-DENIS.

Figure 7 & 8 captions – Describe the data density subplots (b) and (d)

Figure 7c and 8c – The annual mean difference CS-AS UVI seems to follow very closely the DJF mean – Is this correct? Seems like the mean should be approximately in the middle of all the monthly means, but this is not the case for much of the plot, especially in 8c.

Table 1 – Region location for Juan de Nova station should be Ile Juan de Nova

Reference missing bibliographic information: Pastel, M., Pommereau, J.-P., Goutail, F., Richter, A., Pazmino, A., Ionov, D. V., and Portafaix, T.: Construction of merged satellite total O₃ and NO₂ time series in the tropics for trend studies and evaluation by comparison to NDACC SAOZ measurements, 2014.

References:

Badosa, J., Calbó, J., Mckenzie, R., Liley, B., González, J.□□A., Forgan, B. and Long, C.N. (2014), Two Methods for Retrieving UV Index for All Cloud Conditions from Sky Imager Products or Total SW Radiation Measurements. Photochem Photobiol, 90: 941-951. <https://doi.org/10.1111/php.12272>